

132 variable, thus making agriculture hazardous. The growing season is short, with about five frost free months; even the few crops
(241) that can be grown are often injured by autumn frosts. Dark colored
134 chestnut earth is common only on the higher parts of the loess plateau of Shensi and Kansu provinces. It also occurs in the high plateau region of Chinghai Province. In the loess region most of the well-developed dark chestnut earth has been buried under recent loess and alluvial deposits. (T.H. Shen. Agriculture Resources of China, p. 20.)

2. Agriculture

241 Important irrigation systems, made possible by the Yellow
312 River and its tributaries, have been developed in Kansu, Ninghsia, and Shensi. All these irrigated areas except Shensi produce one crop a year, such as wheat, millet, peas, or flax because the growing season is short. The large irrigated plains in Shensi along the Wei River, a tributary of the Yellow River, produce good American upland cotton in addition to wheat, corn, and millet. The largest irrigated area is in the Ninghsia plain where there are twenty-five canals from the Yellow River maintained by the provincial industrial bureau. Irrigation is only possible in the valleys, but they are narrow and comprise but a small percentage of the total cultivated area. When Buck made his survey of this area in 1929-1933, he estimated that thirteen per cent of the total cultivated land was irrigated. He felt that the extent of irrigation sometimes depended upon the prices of agricultural
(651) products fell. Because taxes were still imposed on irrigated land and some of these taxes had even increased, further construction of irrigation works was abandoned until prices commenced to rise again.

• 137 The vegetation of this region is distinguished by the xerophytic plants, bunch grasses on the high elevation, and the tall and short grass sod. In Chinghai province, the Tsaidam Basin is characterized by desert and weeds, while in the same province, in the vicinity of Kokonor, there is grass. In Kansu, along the foothills and in the mountains, grass and weeds exist while in the desert area of Ninghsia, only weeds grow. Grass grows in Shensi along the Chin-ling and Huang-lung mountain ranges.

241 There is an inadequate amount of green manure crops used in this region, which has resulted in a shortage of organic matter and a deficiency in plant nutrients, especially nitrogen. In most of the
(372) area, straw of rice, wheat, rape, and legumes are not ploughed under but are used for fuel, decreasing an important source of organic matter to the soil and removing minerals necessary for plant growth and crop production. Application of chemical fertilizer in addition to local manures and the plowing under of plant residue is very necessary to soil fertility.

313 mostly in Kansu. In 1945, large-scale afforestation projects were undertaken by the provincial government, especially in Ninghsia. [185] The exceptional fact about these projects was that the young seedlings were properly cared for and did not die as so frequently occurred in other afforestation schemes. The Ninghsia projects were, of course, taken over by the Chinese Communists.

311 In the loess plateau region, between the great wall and the mountains, and between the Tibetan Highlands on the West and the Yellow plain to the East, there is almost no forest cover.

313 Forests are found only in the more inaccessible areas or in temple groves. Their disappearance is related partly to needs for lumber but also to the introduction of new crops, such as corn and Irish potatoes, which will grow on the upper slopes. Many hills were burned over in order to clear the land for a cultivation [241] [134] which could last for only a few years until erosion swept away the last trace of soil.

5. The border region

* 175 In 1937, the Chinese Communists occupied the northern portion of Shensi as well as the fringe areas of Chinghai, Kansu, and 668 Ninghsia. This region was regarded as the Shensi, Kansu, Ninghsia, Chinghai border region and was developed by the Communists 433 into a relatively self-sufficient area. When they were able, they exchanged surpluses such as oil, salt, herbs, skin and wool for articles which they could not as yet produce in sufficient quantity. [437]

* 175 The Communists carried out land reform as soon as they were fully entrenched in power. Large land holdings were cut up and 668 parcelled out to peasants with little or no land. Rents and interest 423 rates were reduced, efforts were made to extend cultivation, increase the number of draft animals, and develop labor cooperation beyond family circles.

* 175 In a study by Yung-ying Hsü, issued by the Institute of Pacific Relations, there is a summary of the economy and military status of this region. There are numerous statistics to indicate increases 668 in production of certain crops. These are the only available statistics we have for the region during this period, and the figures 433 seem to indicate that despite the excessive expenditures for the maintenance of an army and guerilla forces as well as a governing body and administration, progress was made in raising the level of agriculture. However, by 1943, trade figures for the region indicate an imbalance of payments and a drain of currency from the region indicating that increasing military commitments were absorbing the created wealth of the region.

D. Conclusion

13 We may sum up the obstacles to agricultural development as follows: geographic and climatic problems are the most serious. 241 311 The amount of cultivable land that can be reclaimed and used for

142 FROM T'AOCHOU TO LANCHOU FU [CH.

513 European scholars have maintained that the Hsifan are not Tibetans and suggested that they represent a northern branch of one of the non-Chinese races of S.W. China, like [197] the Lolos or Mosos. Granting that there is no such thing as a homogeneous Tibetan race, the Hsifan of the country west of T'ao Chou speak the Tibetan language and are as much Tibetans as the inhabitants of any other portion of the Tibetan plateau. A little further north they come into contact with the Kokonor Mongols, whom they bully and plunder. Unlike the Mongols, who are everywhere being pushed back by the encroaching Chinese agriculturist along the northern borders of Shansi and Chihli, the Tibetans of the Kansu border hold their own against the Chinese colonist; partly perhaps because the country is too elevated to suit the latter, but also because the N. Eastern Tibetan is truculent and independent compared to the Mongol and further takes readily and successfully to agriculture. Their food is the buttered tea and tsamba (parched barley meal) 272 of the Tibetans everywhere. Tsamba is a palatable food 262 for people fond of porridge, and the buttered tea is not at all bad when regarded as gruel or soup instead of tea; it is for this reason that the bitter teas of India are unsuited to the Tibetans. It is often said that the Chinese sell the merest refuse of their tea bushes to the Tibetans; but it happens to be what the latter want to make their gruel with. There is little or no resemblance between the tea drunk by the Tibetans and that consumed in Europe.

142 There appear to be two racial types in Tibet, the short round-faced Mongoloid type, and the tall prominent-featured Aryan type; the latter is common among the Tibetans of Amdo as amongst those of Kham. A peculiar 516 feature of the eastern Tibetan, by which he could in nine cases out of ten be recognised in Chinese or foreign dress, is his habit of standing with his feet turned out at right angles to his body.

487 From Heitso Ssu the trail runs north over low grass-covered hills for a few li and then descends through a rocky 133 gorge to a small monastery called K'achia Ssu (all our names [792] are Chinese) lying in a narrow wooded valley trending N.W. In this neighbourhood there grows a plant poisonous to [137] ponies and mules. From here the track runs down the

x] FROM T'AOCHOU TO LANCHOU FU 143

valley, at first through cultivated fields and then through a densely wooded gorge. This is a difficult march in the summer, as the trail constantly crosses and recrosses the stream, which is rapid, obstructed by boulders, and only just fordable. Several of us got a wetting, but we were lucky in keeping the pack-mules on their feet and our bedding dry. The mountains in the neighbourhood are covered with fine forest, but mostly on the slopes facing north only, a peculiarity which may be noticed all along the Kokonor border; I have observed the same thing in the forests of Northern Shansi; whether it is that the sun is too hot on the southern slopes, or that the northern slopes alone receive sufficient moisture, I am unable to say. Four to five hours' march down this gorge, past several small lamaseries, brings one to the junction of this stream with the Tahsia River, a torrent flowing from Labrang to Ho Chou. The Labrang road turns up this valley and runs for a few li through cultivated fields to the small monastery of Shakou Ssu, which lies on the north side of the stream, with a Mahomedan hamlet, Sasuma, opposite, where we passed the night in an inn. There are pine forests all around, and the Tahsia River, though only a mountain torrent, is used for rafting the cut timber down to the Yellow River and Lanchou. The timber is made up into narrow sections, fastened one behind the other, and the jointed raft which results is navigated down the rapids and through the rocks with extraordinary skill by Mahomedan raftmen.

From Heitso to Labrang is a distance of some 120 li, and Sasuma lies about half way, the track running for the rest of the way up the valley of the Tahsia River. For the first 30 li the path is very bad and rocky, the valley being a gorge hemmed in by wooded mountains; there is no more fording to be done, however, as the river is spanned by good cantilever bridges, this being a portion of the Labrang-Ho Chou road, which is much used by the mule trains of Mahomedan merchants. In this neighbourhood we saw some *ma chi*, the large and handsome silver pheasant with red legs (*Crossoptilon auritum*, probably). For the second 30 li the valley opens out and the road becomes a good highway. The first intimation we received of the approach to Labrang were the white and blue tents dotted

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THE LAKE OF THE CRESCENT MOON 139

the work of man, but the Crescent Lake is the work of the gods,' we were told. It was only three miles from the city, but proved to be so curiously located that one might easily be only fifty yards from it and yet remain unconscious of its existence. We were warned that the road was heavy, so we left in good time, having harnessed our three best beasts to the small cart. An hour's drive brought us to the foot of the sandhills lying to the south, and then we looked right and left, knowing that so far we had not missed our way, yet being quite unable to determine in which direction we should continue. 133
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Finally we turned to the right, when almost immediately our shaft-mule had a bad accident. Failing to disentangle her feet from the soft ground she was pulled over by the two others, falling on her head with nose and mouth completely buried in the loose sand. A yell from the driver brought our second man to the rescue, and they were fortunately able to lift the poor creature up before she was completely smothered. Meanwhile Elder Liu, who had been made responsible for the enterprise, went on ahead, climbing a sand-dune about three hundred feet high. A signal from him, and we proceeded to follow, undertaking one of the most difficult of ascents, as at every step we sank well above the ankles, and finally were obliged to take off our shoes and climb in stockinged feet. When we reached the upper ridge, still we saw nothing beyond the vast expanse of sandhills, but one step more and below, in the narrow space dividing us from the next hill, lay a most exquisite miniature landscape—a small, crescent-shaped lake, in colour a sapphire-blue, while owing to a strange optical effect, the sand slopes around took on a wonderfully soft, mother-of-pearl iridescence. Behind the lake and opposite to us stood a small temple and 133
137.

THROUGH JADE GATE

133 rest-house in the midst of a group of trees, the whole
 137 picture being reflected in the water, wherein numbers of
 little black ducks with white beaks disported themselves, dipping and reappearing continually. The little divers found the current to be so strong, that as soon as they reached the western extremity they rose above the water and trusted to their wings for the return journey rather than battle against the stream.

133 There is another curious phenomenon¹ the facts of
 823 which we were able to test. We were told to slide down
 778 the sandhill propelling ourselves by movements of our hands. This we found to be a very simple and effective way of descent, as the whole warm dry surface moved with us. At a certain point a loud, clear, vibrating sound responded to our movements, resembling the twang of a mighty musical instrument, which sound seemed to proceed from the very centre of the hill.

Another name for the locality is 'The Door of Thunder,' from the extraordinary sounds that sometimes are heard, when the whole valley echoes and re-echoes with a noise like that of rolling drums, and when the sand, moved by the vibration, starts rolling, and continues to roll for hours on end. It is most amazing that this little lake and its surrounding temples should not long ago have been buried under the sand-hills. Certain it is that, however fierce the wind, it always carries the sand away from the surface of the water; were it otherwise one windy season must be enough to alter the whole aspect of the scene.

'The Side Door of Paradise' is a name frequently used by Buddhist pilgrims when speaking of this lake. Only a few hundred yards from the rest-house is a sand-choked depression, with temple buildings almost wholly submerged by drifting sand, and here was formerly a sheet of water as clear as that of the Crescent

I [At the Lake of the Crescent Moon
 - Analyst]

THE ONWARD TREK

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we strolled between the flower-beds listening to singing ³⁵¹ birds, which, alas! were in cages concealed among the branches of the trees. The arrangement of the garden was highly skilful and artificial. In one place a miniature mountain showed tiny paths connecting shrines and temples, all built to scale, while the whole was watered by the ramifications of a sparkling little stream, on the banks of which stood diminutive men, women and children—the whole happy-family scene conveying the impression of a life spent in Elysian fields, which no disturbing element could touch. A good ³⁵¹ deal of the verdure in the flower-beds was supplied by ²⁶² asparagus plants, known to the Chinese as 'Dragon's Beard,' which seems to be indigenous to Kansu, but ^[824] which, strange to say, the people do not care to eat. ^[137] Many are the bitter weeds, leaves and buds which the Chinese cleverly convert into palatable food, but the delights of asparagus have not yet been discovered by them, and it is distressing to a Westerner to see the shoots allowed to go to leaf without ever being cut.

The meal served to us was of the usual kind, com-²⁶² mencing with dessert and *hors d'œuvres*, and proceeding to chicken, fish, birds' nest-soup, and sweet rice; then reverting to sharks' fins, seaweed, and apricot-kernel syrup; ending with plain boiled rice, rolls, and several basins of vegetable soups with meat balls, while on this occasion a seasonable dainty was provided in the shape of light fritters, made from the petals of the tree-peony. As we were by now on a footing of intimate friendship with these ladies, the social intercourse and delightful food thus prepared for us made a pleasant interlude coming between the exacting claims of the last days.

Late one evening a Suchow man of our acquaintance, ⁵²¹ Mr. Li by name, called, bringing with him a gentleman ¹⁷²

5: Tafel--463 T-3 (1905-1908) 1914 Aji Tibet
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Plate LXIII



all timbers in the Tschegj idyibiren Range,
3,700 meters high.

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Limestone cliffs near Tschegj Gung.

1272C/

N.W. China AF3

The town which I had come across
 133 was called Kabatalen and the river was the Tschabtscha Chu.

Now, inasmuch as on all our maps and even on those in the Stieler atlas a river by the name of Huyuyung Chu is shown as arising in the Dabassu Nor and flowing through the region in which I found myself, I was not a little baffled by the fact that my Tschabtscha Chu and the Huyuyung Chu were not supposed to be one and the same river. In order to clarify this point and make certain of it I did not travel due south from Kabatalen but turned around again and went in search of the Huyuyung Chu.

137 The days in Kabatalen and before that in the dry valley were very bad for the animals. There were many stones and there was little grass. The valley slopes were bare; they consisted of rubble, of many coarse granite and quartz fragments, and the poor beasts walked themselves foot-sore without finding anything. But on the valley floor and on the edge of the brook the winter grass was completely consumed except for a few stubbles and dried up, hard /295/ shrubs. In the lowest and most protected places also the new grass was not more than 2 centimeters high, and even these insignificant traces of it were to be found only on the edge of springs which are remarkably abundant in Kabatalen because it is almost on a level with the Hwang Ho. In spring the animals are exceedingly thin because the yaks are dependent solely on open pastures, since the nomads do not make hay and do not feed them during the long winter months. A few days of fasting and slight exertions and they are completely exhausted. Thus, from the beginning I was forced to count on losing at least a half dozen oxen when I crossed the tala. But after a day of rest in Kabatalen the prospects became much worse, and on April 30 when I left the Tschabtscha Chu Valley there were already more than a half dozen stragglers. In the evening three yaks were missing; they had remained lying in the sand along the way. The first longer trek was already too much for them.

133 At Kabatalen we had already left the valley of the Tschabtscha Chu and climbed up the plateau of the tala. During the first few
 132 hours of the morning we went over a hard and completely level surface like a huge threshing floor on which only now and then a miserable little plant grew. The soil consisted of pebbles that were solidly cemented together. A few dunes lay in our path, yellow piles 20-30 meters high, that looked as though giant hands had here worked with a winnowing shovel and separated chaff from wheat. Besides them the plain had been swept clean of the last grain of sand. The dunes

built up of extremely steep and, for long distances, of absolutely vertical layers of Permian sandstone and argillaceous slate slabs. A labyrinth of quartz veins gleamed out of the dark green and blue rock. This white quartz is the parent rock of the gold that the Chinese wash out of the valley gravel. We began our ascent just beyond our camp. To the left and right of our route countless peaks showed a snow-cap. In accordance with the vertical layers present, the mountains showed a complex structure, but there were no sharp outlines anywhere. The rock was too soft to admit of large rock formations.

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On the second day after we left the tents of the Schüch'tsong Tibetans we already crossed the easy pass of Tscheger tscheibtsen (rdyibtsen) la whose /313/ altitude I determined with a boiling /Siede/ thermometer to be 4,255 meters. However, the peaks are 1,000 meters higher. A barren highland valley now lay spread out before us; it ran straight as an arrow to the northwest. But immediately beyond it new peaks arose, and a new high and unfathomable wall of mountains stood in our path. The barren valley was shaped like a kneading trough, and the secondary ravines terminated in the mountains round about in the shape of broad, round depressions. All the peaks that were not covered with snow were thickly strewn with angular fragments of boulders.

The vegetation was frighteningly sparse. In the bottom of the large valley as well as in a few valley pockets there were highland moors that showed denser coverings of grass. But these were interspersed with thousands, nay, millions of small water holes so that the plant covering looked as though it were moth-eaten or like a sieve (see Figure 17). The plants were all only 10 centimeters high. Added to that, it was mid-winter. The temperature rose to above freezing only minutes at a time. The individual tufts of grass were frozen solid and the poor animals slipped off the round plant cushions at almost every step into the half-meter- and often meter-deep puddle holes which now in winter were almost dry and filled with pointed, sharp needles of ice. In the turf of these highland moors - the Tibetans call them *naka* - the *Carex* genus predominates and the animals reluctantly ate the hard stalks of these. (1)

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1. In many of these *naka* holes there are countless iron bacteria whose metabolic products, ferrous oxide precipitation, is deposited at the bottom of the puddles in thick red crusts.

commit suicide, only to make things uncomfortable for me. Chinese, as well as Tibetans believe that it is easy for a dead person to take revenge on a living one and that this type of revenge is exceedingly sweet. If I had not had Mohammedans with me, I would have lost this fight over the opium with the personnel of my caravan. With their help alone I effected my purpose of becoming the opium supervisor of my men and cutting down on their daily rations somewhat each day. In this way I controlled the opium threat within three weeks. But on May 22 and 23 Lao Tschang, a man of 45 and a cousin of Da Tschang, howled like a dog all day long because he got less than his quantity of opium.

131 Not far from the tents of the Sidia I had more ill luck. The most valuable of my riding horses, a five-year-old, dark bluish-gray pacer suddenly fell sick. It trembled all over and could walk only totteringly. We soon pitched camp, but the animal nevertheless collapsed. It had eaten du ts'a, a poisonous grass, that not infrequently occurs in Tibet. Many horses die of it. The most unpleasant thing about this type of poisoning is that horses never learn not to eat this grass. I was told that horses sometimes become sick three or four times in succession. But in most cases the poison is soon fatal.

7% May 23. According to the Chinese calendar this is the first of the leap-year month. Last night the men built a large altar of earth and stones. At sunrise they performed their sacrifices on it. Tsch'eng blows into a shell, sprinkles water, and everyone prostrates himself before the rising sun. Cedar twigs which have been brought from the Ga fo ying pan are burned as well as a few grains of rice and /319/ pieces of tsamba dough. This service is held on the first and the fifteenth of each month. Seen from my tent, this cult always looks very biblical.

133 We had been traveling in the Tschürnong Chu Valley for a long time now. In the Sidia Fan tse territory this valley is many kilometers wide and is almost a plain with low roundish rows of hills for a distance of more than 50 kilometers, up to the other side of the Hwang Ho. The Tschürnong Tschü River itself, however, we saw for the first time on May 24. We were amazed when we stood before a crevice over 200 meters deep, in which, far below the river rushed along with dashing waves (Plate LXVI). Such contrasts are not to be found anywhere in our Alps. Here there was an unfathomable rock terrace covered with low grass and clearly recognizable as the floor of an ancient glacier, while in the very center of it was a deep, precipitous gorge, full of rock fragments, cataracts and eddies, on whose walls

On June 10 we reached the shore of the Merduch' Ts'o without further difficulty. The lake lay like a mirror before us. Half of it was still frozen. Blocks of bluish ice stood out against the dark green of the water, and around the shore were bizarre-shaped ice boulders that told of violent storms. Ice floes a foot thick had been hurled onto land at a distance of many meters, and there they formed a high wall. This must have been done by the winter storms, the summer storms do not have the power to move such tremendous masses, not even severe thunderstorms, of which we were having two a day as a rule.

I followed the shore all day long. I wanted to survey the entire west shore and travel over it, because here low hills had created varied shore formations, deep bays and peninsulas. We were finally stopped by a tiny brook on the extreme western edge of the lake, where we could not find any footing. There we encamped, close by the lake on a narrow headland which ended in a rocky hill. We had just rounded up the animals and rid them of their packs when a magnificent specimen of a Tibetan stag dashed down the rocky hill and ran straight through the midst of the herd. This was the only time throughout my whole journey that I saw such an animal.

The Merduch' Ts'o is 4,100 meters high and is about 23 square kilometers in size. To judge from the marks on the shore, its water level varies a great deal. And no wonder! There was no outlet to be seen anywhere. Nevertheless, it has perfectly fresh water, just like the Si ni Ts'o, the Gungga Nor and the Bayan Nor which also have no outflow. The nomads never seek out its shores, because the pastures are no longer good enough. On the other hand, Tibetan hunters often come here. We found quite a number of tado (tabrdo) cooking places consisting of three stones, such as travelers and hunters erect in order to make a tripod for their cooking pots.

June 11. Today I was pushed off far to the west of the course I hoped to follow. The caravan was obliged to march many hours until it could venture to cross the bottomless morass of the brook. Even so, it took us much more than an hour to go a little more than five meters.

The mountain slopes showed an incline of no more than 5° . But the rocks had dissolved to form a fine, brown, clayey earth that retained all the water. At a 2° and 3° gradient it was too wet for grasses, and finally even for cushions of moss; the naked earth, or rather bare mud covered the entire plain. I finally pitched Camp 33 on a low saddle, the first dry spot I could find. It was 4,315 meters high (Plate-LXX). Beside it there was a thicket of mountain willow

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137 /325/ almost one meter high. The pussy willows had just begun to show. Blue and yellow iris on short stems peeped out of the ground. We stayed in that camp two days, two gloomy, gray, rainy days. The clouds dispersed only to make room for darker ones that discharged hail, snow and rain - often amid thunder and lightning. Only for brief moments the magnificent panorama was revealed and we saw toward the south the glistening white peak of sacred Amne Machin, and, towering 1,000 meters above thousands of snow-caps, the ice-bound surface of Tossun Nor (Mongolian), the Butter Lake, gleamed far to the west. Then it became so clear that with my Zeiss glasses I could distinctly follow a wild yak herd, about sixty head, at a distance of 11 1/2 kilometers.

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579 On our next march, Da Tschang told of one of his worst experiences in Tibet. Four years before he was traveling from Hsining fu to K'am with his Tibetan wife and three K'am Tibetans. They had passed Merduch' Ts'o and had come to the town of Sum ndu. We saw this spot, 13 kilometers southwest of our route, where three valleys open up into the large Tossun Nor Plain. The travelers had only a half dozen pack horses besides their riding horses, and so they covered about 50 kilometers a day. In Sum ndu suddenly a bullet whizzed past them. They quickly retired behind a sand dune and slipped into a hole from whence they hoped to defend themselves. Da Tschang's pack horse was carrying his entire fortune, but the defense looked hopeless. They were surrounded by 120 Sakuch' Fan tse who now closed in on them in their retreat.

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628 If possible, Tibetans avoid killing people. They are held back by fear of tribal revenge, as well as by fear of the spirit of the person killed, which seeks its former possessions. Thus, the rascals were persuaded to parley, in spite of their much greater numbers. Finally, Da Tschang and his friends were permitted to take themselves off on five, skinny old Rosinantes. The robbers kept their horses, their packs and all their good clothes. They were given only enough flour to last until they reached the Horkurma Fan tse who at that time were domiciled three travel-days south on the Hwang Ho. There they were obliged to shepherd flocks for many weeks until a caravan took them along.

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136 My caravan was now in the territory of Lake Tossun Nor, which the Tibetans call Dung re Ts'o ner. Herds of antelope and kyang transported themselves on the edge of the great plain that extended from my camp 20 kilometers to the Tossun Nor.

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Kalmuk

782 influences (in Chinese the ceremony is called: sung gui, in Tibetan:
789 dorma p'en). (1)

1. Rockhill has already described the end of this ceremony in his Land of the Lamas, pp. 113 and 114. From wealthy Tibetans the priests /341/ demand 50 and more pounds to make the tsamba figures. This offering is carried out once a year mostly at New Year, by each family. In Southeast Tibet a bullock's head of tsamba is also usually placed beside the gtorma (probably to represent Yama). There the bullock's head and gtorma are brought to the fire amid the shooting of guns; at the Chinese frontier "crackers" are shot off. In both places cries of "Pfui" are uttered during the procession.

●137 /341/ In the woods of Schang and among the Rengan Fan tse I met for the first time the green da hoang (Chinese), literally: the great yellowness, namely, rhubarb, the mother-plant of our well-known and trusty home remedy. The flower clusters were at this time, the beginning of July, more than 2 meters and in some cases 3 meters tall and covered with pinkish blossoms. The leaves which were deeply slit and tapered off into pointed lobes, had red-speckled stems. Old plants spread their thick foliage over several square meters of ground and from the tangle of leaves which was two-thirds of a meter high and often looked like a bush, arose individual slender, tall flower clusters. If one digs out these stalks one finds rhizomes up to the size of a bullock head, and in with the roots there are still clusters of young, smaller plants.

The plant grows between thickets and limestone rocks and prefers damp places of wooded areas. But I also found it in moist places of sandstone slopes covered only with grass. It is found up to 4,100 meters. The lowest border of its common habitat is 2,800 meters. (1)

1. A few days before my departure from Hsining I received a letter from Professor Tschirch from the Pharmacological Institute of the University of Bern. He called my attention to the fact that there is still uncertainty about the origin of the common medicinal plant, rhubarb, from a botanical as well as a geographical point of view. He asked me to send him bulbs and

seeds of rhubarb in case I found any.

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In the 13th century, already, Marco Polo reports that rhubarb was gathered in the Koko Nor region and from there sent to the rest of the world. In our time Prschewalski brought back bulbs and seeds as well as dried plants from the Koko Nor on his Tibetan journey in the years 1870-1873, and after that the Koko Nor rhubarb was classified as *Rheum palmatum* L. var. *tanguticum* Maximowicz. But in the course of the years the specimens grown from Prschewalski's seeds in the botanical gardens of St. Petersburg, Bern, etc., changed so much and became so similar to our ordinary *Rheum palmatum* hortorum, moreover, such a large number of new species have been said to be the original plant of the medicinal remedy we use, that the question of its origin still seems unsolved.

Thus, I was very pleased to be able to send Professor Tschirch an envelope containing rhubarb seeds which I had myself gathered in the woods between the rocks near Dulan gomba (37° northern latitude, 98°, 40' longitude east of Greenwich), and that from these seeds, in defiance of all primitive methods of transportation, young plants came up in the Bern Botanical Garden, a year later and long before I left Tibet, which helped solve the problem conclusively. In the *Schweizerische Wochenschrift für Chemie und Pharmazie*, 1910, number 19, Professor Tschirch reports that from the seeds I sent him *Rheum palmatum* L. var. β -*tanguticum* Maxim. developed, in fact, that this species is so different from *Rheum palmatum*, that he feels inclined to classify it as a different species, as *Rheum tanguticum*.

Rheum palmatum is confined to Northeast Tibet, to the highlands of the Nan Shan and Koko Nor, whereas the very different *Rheum officinale* occurs in the more moist south and southeast of the Tibetan mountains. Hand in hand with the variety of species and climate goes the /342/ method of treatment of the bulbs once they are dug out. In Szechwan and South Tibet the root must often be artificially dried in ovens because the summers are too wet. In the north, at Koko Nor, the people who gather rhubarb take the greatest care to dry the bulbs in

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Here the Akkas live and pray, and communicate with the rest of the world only in winter when the lake is frozen over. It is an island that rises up in rock formations with hills that are covered with grass pastures. In the clear winter air the island seemed very near and it seemed to me I could see everything that was on it from the road I was on. It is supposed to be eight li around.

Nine kilometers from the south shore of the lake and 18 kilometers to the west of the large island of Ts'o ning there are still more cliffs rising up over the surface of the lake. They are white in color and are called Tsaghan khada by the Mongols. Among them is the rock which, according to the legend, one of the bad spirits, named Tscheger sâmo, threw toward Ts'o ning in order to destroy the island or at least move it from the spot.

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It was, so the story goes, around the time when unsuccessful attempts were made to erect temples and monasteries in Lhasa. The buildings always collapsed and the Tibetan king therefore sent his vassals all over the world in order to discover the reason for this misfortune. One of the lamas that had been sent out met an old, blind holy man in the plain now covered by the Koko Nor. The old man, in senile loquacity, said that at the spot where the king was trying to erect his temples there was a large subterranean sea. The latter would flow from Lhasa over into this direction as soon as an emissary of the king would find out about it. Scarcely was the secret revealed when the two heard the surging of the water and the emissary of the king could barely escape on his horse, while the old man was swallowed up by the waves. The water would even have flooded all the mountains if some divinity had not had mercy and taken a huge rock and stopped up the hole out of which the water was flowing. This rock is the sacred island Ts'o ning. However, the bad Titan was angry /81/ that the water did not cause more destruction and he wanted to throw stones to move Ts'o ning and re-open the hole. Fortunately for all mankind he did not hit Ts'o ning. The stones which he threw toward Ts'o ning from the shore, all fell into the water half way to the island and there they can still be seen.

According to a Chinese version a woman once wanted to fetch water from a well where the island is today and forgot to put the lid on the well. So the water rose up and covered the entire plain. A god, Wo fo (Buddha), finally had mercy and threw a slab, the island, onto the magic spring.

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There were magnificent grass pastures covering the entire south shore of the lake from the water's edge up to the rounded peaks that

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137 bordered it. These pastures are famous among all the nomads and many Tibetan songs sing about the Ts'o ngombo (1) yung, the Koko

1. The Chinese, as De Groot also writes (see *Les fêtes annuellement célébrées à Emoui*, I, 92, footnote 2) use the word tsing (tsching) for the blue of the sky as well as for the fresh green of the leaves. Thus also the North-Tibetans who use ngombo for "blue" and the fresh green of the prairie grass.

Nor Plain, as the land where there is an abundance of milk and butter. This region, although it still belongs to the part of Central Asia without drainage, nevertheless has enough rainfall in the summer months so that the grass can grow very well. In winter the country is favorable for nomad settlements because there is very little snow and the herd animals seldom have difficulty in finding their feed under the thin covering of snow.

In spite of the relatively low level of the lake - according to my measurements it is 3,200 meters (2) - there are strikingly few trees

2. Hedin 3,040 meters; Futterer 3,250 meters;
Prschewalski 3,200 meters; Kozlow (1901) 3,210 meters.
On November 6 and 7 the temperature of the water was +5°C.

to be found here. I was able to discover a few conifers in a few hollows, and hidden between rocks. Otherwise the wind, the storms from the west, which sweep over the plain in winter, make it difficult for trees to grow. However, perhaps it was also man who in early times destroyed the trees here. On the other hand, gnarled willow shrubs are often found here but this also - as everywhere in Tibet - only in places where they are protected from the drying effect of the sun, on northerly, northwesterly, and northeasterly slopes.

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000 There are a number of Tibetan tribes scattered along the south shore. When I passed through, however, they were all living on the warmer south side of the South Koko Nor mountain range, and we looked in vain for people from the Dabassu Nor Plain up to the east shore of the lake. Of living creatures we saw only a bear and he, to my great sorrow, took to his heels long before I could creep up on him. The shore lay lifeless. In vain the eye sought a sign of life on the surging blue sea which, toward the northwest, seemed to be

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hooked noses of some tall Ngolok and the isolated cases of very vigorous growths of brownish-red beards in East Tibet. However, for the people of Lamda our conversation had a much more practical significance. No man wanted to marry the blond, blue-eyed girl, and no respectable girl the blue-eyed man, and when the girl went on a pilgrimage to the West she was constantly stopped and taken for a European.

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Less than an hour's journey from Lamda there is a little village that /134/ hangs on the steep rib of rock like a bird-house, and here the floating ice of the Dre Chu piles up and forms an ice bridge connecting the two shores. While I was still in the Lab gomba territory I was told that this bridge had already given way and was washed away. But it was firm as a rock when I rode over it on February 23. The inhabitants of the village belong to a different Hoschunat from Lamda and put no obstacles in my way. They exact a small toll from everyone who uses their natural bridge and for this they point out the safest ice blocks. They had also marked the crossing with large round pebbles that were laid out like the links of a chain. Every pebble was painted red and had a letter scratched out on this background, so that the pebbles together formed words and the whole chain, devout prayers, uniting the two shores and making the bridge safe for the pious inhabitants. There were two of these prayer chains leading across the entire river. The shore was bordered with mounds of stone slabs all of which were covered with reliefs of prayers and Buddhas, tschorten, bunches of faggots flapping with scraps of sheep wool, and other symbols. In Tibetan eyes it is a very sacred spot because the local spirits each year cause the bridge to be formed. Our leaders as well as ourselves sang out the invocation to the gods and all the saints as long as we were on the ice!

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The ford was 3,650 meters above sea level and the ice of the river was 150 meters wide. There were scrub forests high up on the steep sides of the valley. Groups of spruce and ancient rhododendron furnished a faded green in between dark precipices. At each valley entrance the eye was met with new delights and wonders, glimpsed new snow-capped peaks that looked down on the clear greenish-blue Yangtze. Down in the valley the snow seldom lasts. Unless it has fallen in sheltered pockets, the rays of the sun soon lick everything clean (Plate XXI).

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Eleven kilometers below the place where we forded the river we again left the Yangtze Valley and turned off at a sharp angle to the southwest. Toward the end the valley had grown ever narrower, the

Even the imperial telegraph line led over the ^{N.W. China AF 13} bleak saddle of ²⁰⁶ the Dschedo la and its 4,390-meter altitude. (1) The line had

1. Kreitner-Szechenyi 4,499 meters; Rockhill 4,365 meters (14,320 feet); Gill 4,425 meters (14,515 feet); War office map 15,000 feet.

just been completed as far as Ba tang. My Hsining men who had never before seen a telegraph line had to conduct a detailed investigation. Of course, they had long since heard that one could send a whole letter over the wires, but they had the most adventuresome ideas as to how this was done. They wanted to cut the wire and see what the hollow space inside looked like. Shortly after I had dissuaded them from this wild idea we met a telegraph sentry consisting of six men strong. They were looking for a damaged wire because the service had been interrupted the day before. It seemed a miracle to me that one could telegraph at all at the time because hardly any of the insulators on the poles were intact. The Tibetans regarded them as a particularly suitable target for their guns as well as for their beloved stone slings.

Beyond the Dschedo Pass the eye first of all falls on bare rocky ¹³³ ridges and on broad, planed-out and dry ravine bottoms. The peaks in the vicinity of the pass rise above 5,000 meters. They are all still below the boundary of perpetual snow and one could discover on them only scattered white spots. However, when one descends the steep, uneven military road which was paved many years ago, and when one has turned the corner and reached an eroded ravine bottom, then suddenly gigantic fields of perpetual snow sparkle in the south (Plate XLVI). In front of these in the depths nestles the Dschedo Valley with the little village of Dschedo, an important stopping place for the night for people coming from below. Before one reaches this town one crosses the wide rhododendron zone /202/ which, ¹³⁷ with its large white and pink blossoms, extends down from 4,500 to 3,800 meters. The large blossoms were just opening and the steep mountain slopes sometimes formed a vertiable sea of blossoms. Long before one reaches Dschedo one is within the boundary of mountain forests, and the amount of moisture which the monsoon must unload in these border mountains has caused an almost impenetrable jungle to develop on both sides of the valley, on the northern as well as southern slopes.

Near Dschedo the ravine which is used by the road abandons its ⁰⁰⁰ southeasterly direction and turns due east, and now all at once there